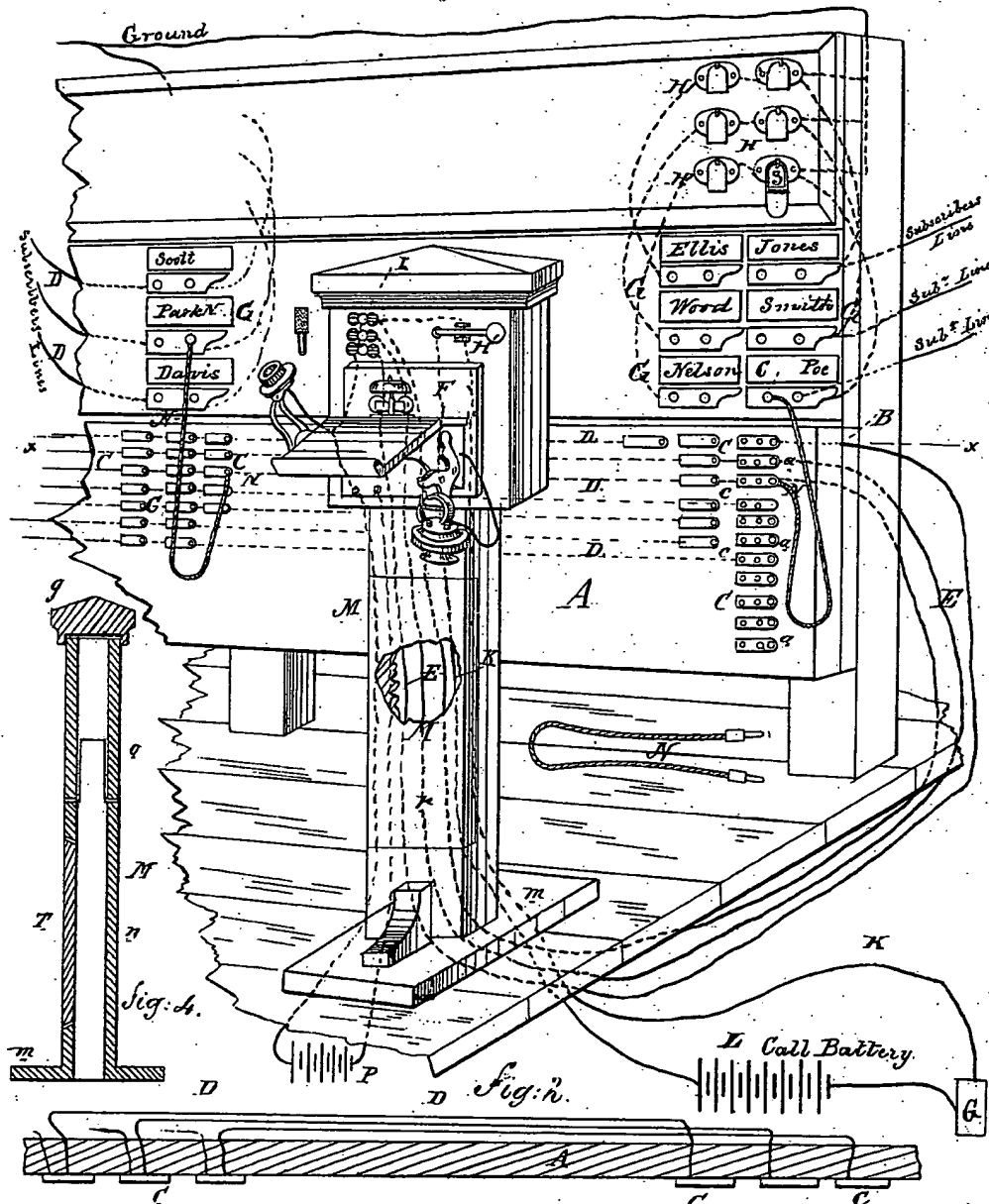


2 Sheets—Sheet 1.

No. 240,983.

Patented May 3, 1881.

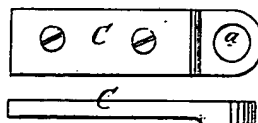
Fig: 1.



WITNESSES:

Chas. Nida
to Eugene

Fig: 3



INVENTOR:

T. G. Ellsworth

BY

ATTORNEYS.

(No Model.)

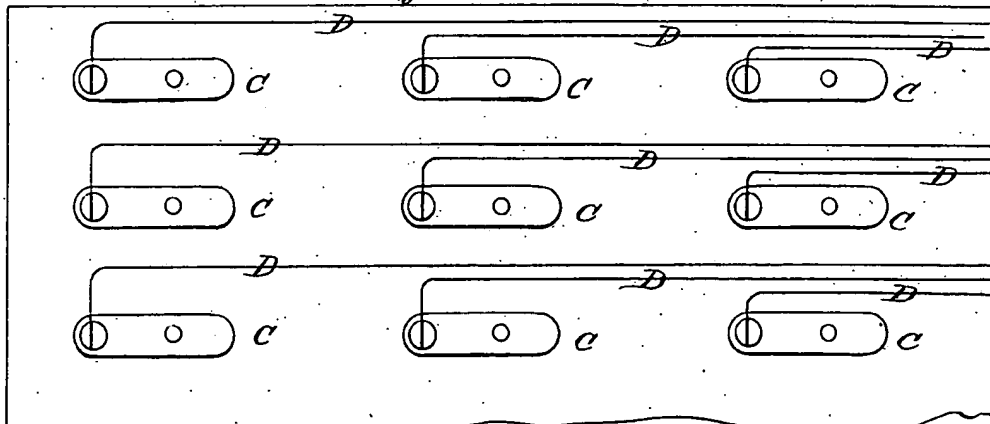
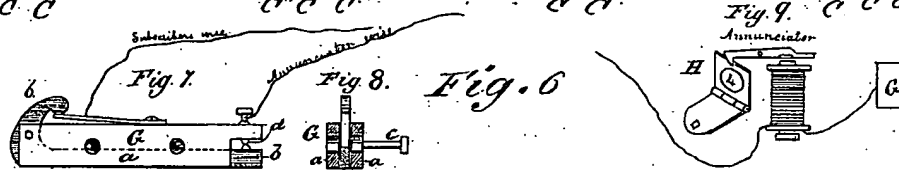
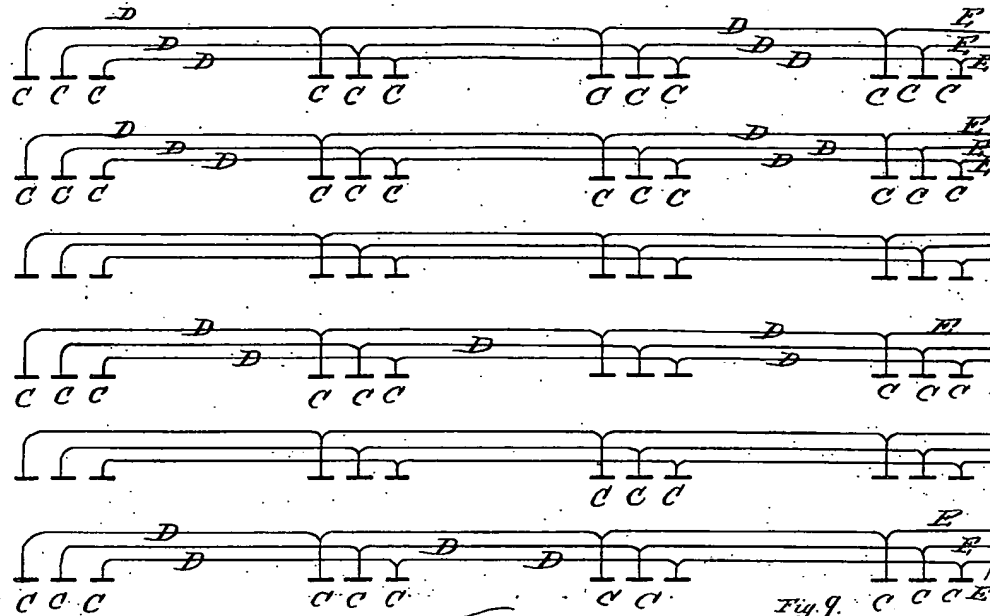
2 Sheets—Sheet 2.

T. G. ELLSWORTH.
Telephone Central Office Apparatus.

No. 240,983.

Patented May 3, 1881.

Fig. 5



WITNESSES:

C. Neveu
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UNITED STATES PATENT OFFICE.

T. GARDNER ELLSWORTH, OF NEW YORK, N. Y.

TELEPHONE CENTRAL-OFFICE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 240,983, dated May 3, 1881.

Application filed April 23, 1880. (No model.)

To all whom it may concern:

Be it known that I, T. GARDNER ELLSWORTH, of the city, county, and State of New York, have invented a new and Improved Telephone Central-Office System and Apparatus, of which the following is a specification.

The object of this invention is to facilitate connection between wires of telephone-lines in a telephone central office, and to afford means for making such connections rapidly and accurately.

Ordinarily in telephone central offices mistakes and delays in connecting and disconnecting the wires of communicating parties are of frequent occurrence, for the reason, among others, that the operator at the telephone cannot conveniently, or does not himself, connect and disconnect the wires, but gives directions to others to do so; hence results much noise and confusion, and consequent misunderstanding and forgetfulness or neglect of orders.

To avoid these difficulties I have invented a system involving the use of novel switch-connections and of novel telephone-stands and their peculiar arrangement relative to each other, whereby each telephone-operator is enabled easily and without delay to connect and disconnect several communicating wires that are connected with his instrument.

Figure 1 is a perspective view of my improved device as applied in a central telephone-office. Fig. 2 is a longitudinal sectional view of the switch-board, showing the rear connections. Fig. 3 represents a front and edge view of the improved connections. Fig. 4 is a sectional side elevation of the improved telephone-stand. Fig. 5 is a diagram representing the construction of the connections, and Fig. 6 is a front elevation of one set of connecting-plates. Figs. 7 and 8 are respectively a side view and cross-section of the switch detached from the switch-board. Fig. 9 is a perspective view of the parts composing the annunciator.

Similar letters of reference indicate corresponding parts.

One of the principal features of my invention is the device by which connection is effected between two or more lines terminating in the central office. This device, or "connector," as I have termed it, consists of a series of wires, D, secured to a board, A, and attached

at intervals to metal plates C. The plates are arranged in horizontal and vertical rows, and in practice will generally be divided into groups or sections, as shown in Figs. 1, 2, and 3. Each wire is connected with one plate in each section or group. For example, the upper wire D is connected with the upper left-hand plate C in each section. The second wire D is connected with the middle plate C in the upper row in each section, and the third wire is connected with the right-hand plate in the upper row in each section. The fourth wire D is connected with the left-hand plate in the second row in each section, and so on. These connections occupy but little space and are very inexpensive in their construction.

A wire, E, connects either or both ends of the wire D with a telephone, F, and series of telephones F are located in a central office at the most suitable distances from the switch-board A, and opposite the annunciator and switch-sections, for the purpose of rapid manipulation of the switch-plugs in the process of connecting and disconnecting communicating wires.

Above the switch-board A are fixed series of ordinary plug-switches, G, connected with the line-wires extending to subscribers' telephones. These switches are connected with ordinary annunciators, H, located still higher up, and one terminal of each annunciator-magnet is grounded, so that each subscriber's telephone-line has its own switch and annunciator, and is grounded through the annunciator.

The switch employed is what is commonly termed the "jack-knife." As shown in Figs. 7 and 8, it consists of a longitudinally-slotted bar, *a*, and a bar, *b*, hinged thereto. The bar *a* has transverse holes and one or more screw-bolts, *c*, for attaching it to the switch-board. The arrangement is such that when a tapered plug is inserted in either of the holes in bar *a* the bar *b* will be turned on its hinge so as to separate the points *d*, and thus break the circuit through the annunciator.

The telephone-stand M holds one or more complete telephones, F—that is, a transmitter, receiver, and call—and all the connecting-wires are conducted inside of the hollow stand M, and are not exposed to view. The stand M consists of a base, *m*, a hollow standard, pref-

erably rectangular and constructed in two sections, *n* *o*, united by tenon and socket, the face *p* of the lower section, *n*, being removable. The stand has a removable cap, *q*, which admits of adjusting the wires readily. The stand *M* is provided with as many switches *I* as the attendant can manage. In the present instance three are shown. One half of each switch *I* is connected with the telephone on the stand, and the telephone is grounded, in the usual way, through the wire *K*, and the transmitter is also connected with a battery, *P*, as shown. The other half of each switch is connected with one of the wires *D* on the board *A* by a wire, *E*, so that three of the wires *D* are connected with the three switches *I* on the telephone-stand *M*.

The operation of the system is as follows: For instance—Poe, desiring to converse with Park, signals to the central office, and thereby drops the annunciator *H* connected with his wire. The telephone-operator, seeing this, at once takes a pair of connected coupling-plugs, *N*, and by inserting one of them in the switch *G* on the subscriber's line cuts off the annunciator and the ground, and by inserting the other plug in one of the plates *C* connects the subscriber's wire with one of the wires *D*, and consequently with one of the switches *I* on the telephone-stand *M*. Then the operator inserts a plug in the proper switch, *I*, and signals Poe by throwing the call-battery *L* into communication with the subscriber's line by means of the call-key *H'*, connected with the said battery *L* and with the switches *I*. This causes a bell to ring at Poe's office, to notify him to announce his wish to the telephone-operator at the central office. Poe then asks to be connected with Park; then the operator at once connects Park with Poe on the same wire *D* by inserting a plug, *N*, in the plug-switch *G* connected with Park's wire, and inserting the connected plug *N* in one of the plates *C* connected with the same wire *D*. The operator calls Park by means of the call-battery *L* and informs him that Poe desires to speak with him. The telephone *F* and ground *K* are then cut out of the circuit by the operator by removing the plug from the switch *I*, when Poe and Park are connected as by a private wire. About once a minute the operator closes the circuit by inserting the plug in the switch *I* long enough to determine if the parties are still

conversing. On discovering that they have finished talking he disconnects them by withdrawing the plug *N*.

Each operator connects and disconnects all the subscribers that he answers at the central office, and hence there are but few, if any, such delays or mistakes as are common to other telephone-exchange systems. The telephones are placed within easy reach—a step from the switch-board—so that operators can work rapidly and without interference, and the switch-connections *C* and wires *D* are so compactly and conveniently arranged that one operator can keep three or more connectors in operation at the same time.

After opening the circuit of the connector used by Poe and Park, for instance, the operator will close the circuit of another connector and bring two other parties in communication with each other, and so on with third and fourth parties, care always being exercised to disconnect when parties have finished conversing.

In describing my improved switch-board *I* have mentioned the combination of the wires *D* with plates *C*; but I do not limit or confine myself to the use of the plates *C*, as I may use bolts or clamps or other devices answering the same purpose.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a telephone central-office system, the combination, with the isolated stand *M* and the telephonic instruments, switches *I*, and call-key *H'*, placed thereon, of the annunciators *H* and switches *G*, connected as shown, the switch-board *A*, having plates *C*, connected by wires *D* and provided with holes or sockets, the flexible switch-cord *N*, having terminal plugs, and the wires *E*, which connect said switch-board and the stand-switches *I*, all as shown and described.

2. In a telephone system and apparatus, the hollow telephone-stand *M*, constructed substantially as herein shown and described, consisting of base *m*, section *n*, having movable face *p*, section *o*, and cap *q*, as set forth.

T. GARDNER ELLSWORTH.

Witnesses:

I. I. STORER,
C. SEDGWICK.